ORIGINAL ARTICLE

Preterm and term birth in twin pregnancies during a seven-year period: a call for obstetricians to declare about amnionicity and chorionicity

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ABSTRACT

Aim To compare maternal, foetal and neonatal characteristics, and perinatal outcome of preterm and term deliveries in twins pregnancies in order to improve perinatal care in Bosnia and Herzegovina.

Methods This retrospective cohort study included pregnant women with twin pregnancy who delivered during the period between 1 January 2012 and 31 December 2018 at the Clinic for Gynaecology and Obstetrics, University Clinical Centre Tuzla.

Results During the seven-year period 26 734 deliveries were recorded, out of which 362 (1.35 %) were twin pregnancies, 226 (62.4%) preterm and 136 (37.5%) term ones. In the preterm group 38 (16.8%) pregnancies were assisted medical reproduction, and 16 (11.7%) of those were in the term group. The average birth weight was significantly higher for the first twin in both groups ($p<0.00001$). Incipient intrauterine foetal asphyxia was more frequent in the preterm group ($p<0.05$). The most common indication for Caesarean section was abnormalities of foetal presentation and lie, 176 (68.2%) for the overall sample.

Conclusion Cornerstone of twin pregnancy antenatal care is to get correct data about amnionicity and chorionicity. Since majority of prenatal data did not have this information we call all obstetricians to declare about amnionicity and chorionicity in twin pregnancies during the first trimester ultrasound examination.

Key words: foetal membranes, multiple pregnancy, premature labour, prenatal care

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INTRODUCTION

Twin pregnancy is associated with a higher risk of perinatal mortality and morbidity, especially in monochorionic twin pregnancies (1). The incidence of multiple pregnancies is rising and accounts for about 3% of pregnancies. The leading cause is an induction of multiple ovulations by medications in order to stimulate ovulation and medically assisted reproduction (MAR) (2-4). The frequency of twin pregnancies also depends on the age, parity and heredity (2,3). Twin pregnancies should be cared for by an experienced multidisciplinary team (1,5). Both chorionicity and amnionicity are crucial for antenatal management of twin pregnancies and should be determined by ultrasound in the first trimester by identification of the lambda or ''T'' sign (1,5). There are specific recommendations for ultrasound examinations in twin pregnancy when it comes to timing, frequency and content of ultrasound assessment, as well as screening for and prenatal diagnosis of aneuploidy and structural abnormalities (1). Monozygotic twins have increased the risk of foetal/perinatal loss, various foetal anomalies and intrauterine growth restriction (IUGR) (1,5).

Preterm births are more common among twins compared with singleton pregnancies. It is estimated that 40-60% of twins will be delivered spontaneously before 37 weeks of gestation, most probably because they reach maturity earlier (1). The timing of delivery for monochorionic/monoamniotic twin pregnancy is usually between 32–34 weeks, monochorionic/diamniotic at 36 weeks, dichorionic at 37 weeks (1,5). Vaginal delivery is usually recommended for uncomplicated dichorionic/diamniotic twins if the leading twin is cephalic and if there are no other obstetric indications for Caesarean section (CS). If twin one is breech, CS might be a more favourable option (1,5,6). Monochorionic/diamniotic twins will commonly be delivered by CS, the option of vaginal birth might be offered to the parents if the leading twin is cephalic (1,2). Monochorionic/monoamniotic twins, according to recommendations, will be delivered by CS (7). Active management for delivery of the second twin is usually recommended to avoid a prolonged intertwine delivery (1). If needed, stabilization of lie, internal podalic version, breech extraction or immediate CS can be employed. In such circumstances, experience and competence of the obstetrician, anaesthesiologist and neonatologist is crucial for successful delivery (1).

Many studies about the outcomes of twin pregnancies have shown higher rates of miscarriages (missed abortion one of the twin or vanishing twin), chromosomal and structural abnormalities (5), anaemia, pre-eclampsia, gestational diabetes, higher rates of prematurity (8), preterm premature rupture of membranes, lower birth weight, stillbirth, higher rates of CS, postpartum haemorrhage (1), and more frequent admissions to neonatal intensive care unit (NICU) (6,9,10). Studies that compared preterm and term twin pregnancies are rare.

Despite of the increasing maternal age and the prevalence of twin pregnancies in Bosnia and Herzegovina there were no studies about the course and outcome these pregnancies.

The aim of this study is to compare maternal, foetal, neonatal characteristics, caesarean section indications and perinatal outcome between preterm and term deliveries in twin pregnancies in order to improve the perinatal care in Bosnia and Herzegovina.

PATIENTS AND METHODS

Patients and study design

This retrospective cohort study included pregnant women with a twin pregnancy who delivered during the period between 1 January 2012 and 31 December 2018 at the Clinic for Gynaecology and Obstetrics, University Clinical Centre Tuzla. Inclusion criteria were pregnant women who delivered twins. Exclusion criteria were twin pregnancies less than 24 weeks of gestation, twins birth weight less than 500 grams, trigeminy, pregnancies with one missed or vanishing twin and pregnancies with stillbirths.

Patients were divided into two groups: preterm birth (below 37 weeks of gestation) and term birth (above 37 weeks of gestation).

The survey was approved by the Ethics Committee of the University Clinical Centre Tuzla.

Methods

Data on the course of pregnancy and childbirth were collected from medical records (patient history and partograms). Obstetrical data included maternal age at delivery, parity, gestational age

at delivery, mode of delivery (vaginal/CS, indications for CS and obstetric comorbidities (preterm delivery <37 and early preterm delivery <32 weeks of gestation, extragenital/genital disease, gestational hypertension/preeclampsia, premature rupture of membrane, placental, amniotic fluid and umbilical cord abnormalities, MAR). Foetal data included intrauterine asphyxia, abnormalities of foetal presentation and lie, anomalies and IUGR. Neonatal data included: gender, birth weight (extremely low birth weight – ELBW below 1000 g, very low birth weight - VLBW 1000-1500 g, low birth weight - LBW 1500-2500 g) and birth length. Perinatal outcome was assessed according to the Apgar score at first and fifth minute, as imminent (Apgar score <9 and >7, respectively) and incipient (Apgar score <8) intrauterine asphyxia, and admission to a NICU (11).

Statistical analysis

Descriptive statistics, mean value, standard deviation (SD) and percentage were used in statistical data processing. Statistical significance of the difference between mean values of variables in the groups was tested by ANOVA test and Tukey's post hoc test. The Student's t-test (statistical comparison test) was used to determine statistical significance of the difference between a set of two data. Statistically significant difference was set at $p<0.05$.

RESULTS

During the seven-year period recorded 26 734 deliveries were recorded, out of which 362 (1.35 %) were twin pregnancy, 226 (62.4%) were preterm, and 136 (37.5%) were term births. Out of the total number of deliveries, 1860 (6.9%) were preterm, of which 226 (12.1%) were twin pregnancies. Early preterm birth was recorded in 42 (out of 362; 11.6%). Spontaneous preterm delivery was recorded in 131 (57.9%) twin pregnancies. During the observed period significant changes were not noticed in the prevalence of twin pregnancies (p=0.397).

Table 1. Maternal characteristics of twin pregnancies

Maternal characteristics	No (%) of women in the group			p
	Preterm	Term	Total	
Twin pregnancies	226 (62.4)	136 (37.5)	362 (1.3)	0.437
Maternal age at the time of delivery (years)				
Mean (±SD)	29.25 (±5.65)	29.92 (±5.18)	29.5 (±5.48)	0.130
<19	7 (3)	0	7 (1.9)	
19-35	176 (77.89	106 (77.9)	282 (77.9)	
>35	42 (18.5)	30 (22.1)	72 (19.8)	0.324
Parity				
Primiparous	137 (60.6)	58 (42.6)	195 (53.8)	
Secundiparous	60 (26.5)	52 (38.2)	112 (30.9)	
Thirdparous and multiparous	28 (12.3)	26 (19.1)	54 (14.9)	0.215
Extragenital diseases*	19 (8.4)	16 (11.7)	35 (9.6)	0.5
Genital diseases				
Gynaecological surgeries	6 (2.6)	5 (3.6)	11 (3)	
Cerclage	8 (3.5)	2 (1.4)	10 (2.7)	
Previous caesarean section	14 (6.1)	12 (8.8)	26 (7.1)	
Corrected/uncorrected genital anomalies	7 (3)	0	7 (1.9)	0.127
Genital infections	12 (5.3)	12 (8.8)	24 (6.6)	
Colpitis	8 (3.5)	8 (5.8)	16 (4.4)	
Chorioamnionitis	2 (0.8)	0	2 (0.5)	0.5
Pelveoperitonitis	2 (0.8)	4 (2.9)	6 (1.6)	
Abnormalities of placenta, amniotic fluid and umbilical cord	27 (11.9)	25 (18.3)	52 (14.3)	
Placental abruption	9 (3.9)	2 (1.4)	11 (3)	
Placenta previa	1 (0.4)	1 (0.7)	2 (0.5)	
Placenta suspecta	2 (0.8)	7 (5.1)	9 (2.5)	
Polihydramnios	4 (1.7)	5 (3.6)	9 (2.5)	
Complications with umbilical cord (wrapped around neck and body, true node and prolapse)	11 (4.8)	10 (7.3)	21 (5.8)	0.451
Gestational hypertension/preeclampsia	24 (10.6)	24 (17.6)	48 (13.2)	0.5
Medical assisted reproduction	38 (16.8)	16 (11.7)	54 (14.9)	0.5
Premature and preterm rupture of membranes	95 (42)	18 (13.2)	113 (31.2)	0.5
Spontaneous preterm delivery	131 (57.9)	-	131 (36.1)	
Earlier miscarriages	5 (2.2)	8 (5.8)	13 (3.6)	0.5
Mode of delivery				
Vaginal delivery	56 (24.7)	48 (35.2)	104 (28.7)	
Caesarean section	170 (75.2)	88 (64.7)	258 (71.27)	0.266

*cardiovascular, pneumological, gastrointestinal, endocrinological, ophthalmological and neurological

The prevalence of twin pregnancies was ranged from 49 (out of 3688; 1.3%) deliveries in 2015 to 64 (out of 3720; 1.7%) in 2017. The overall average maternal age at the time of the delivery was 29.5±5.48, in the preterm birth group 29.25±5.65 (ranged 16-43), and in the term birth group 29.92±5.18 (ranged 20-43) years.

Adolescent (below 19 years) twin pregnancies were represented only in the preterm group, in seven (3%) women, resulting in the overall prevalence of 1.9%. The overall prevalence of pregnant women above 35 years of age was 19.9% (out of 362). Abnormalities of placenta, amniotic fluid and umbilical cord were present in the overall sample in 52 (14.3%), and in preterm and term group, in 27 (11.9%) and 25 (18.3%) cases, respectively. Gestational hypertension/preeclampsia was presented with prevalence of 10.6% in the preterm group and in the term group with 17.6 %, in the overall sample the prevalence was 13.2%. Methods of MAR were implied in 16.8% women in the preterm group and in 11.7% in the term group. Preterm rupture of membranes, as expected, was higher in the preterm than the term group, 42% and 13.2%, respectively. Spontaneous preterm delivery was represented with 131 (57.9%) of all preterm twin deliveries. The most frequent mode of delivery was CS in the overall sample (71.2%), as well as in the preterm and the term group, 75.2 % and 64.7%, respectively (Table 1).

The most common foetal presentation and lie in the overall sample were cephalic/cephalic (51.6%), transverse/oblique lie (19.8%), cephalic/breech (12.9%), breech/cephalic (10.5%) and breech/breech (5.2%). Foetal anomalies were recorded in three (0.8%) newborns. The IUGR was recorded with lower prevalence in the first twin (16.8% and 20.5%), compared with the second one (22.1% and 22.7%), in the preterm and the term group, respectively (p=0.07) (Table 2).

The average Apgar score in the first (p<0.025) and the fifth (p<0.027) minute was significantly higher for the first than for the second twin in the preterm group. The average Apgar score in the first and fifth minute was significantly lower in the preterm than in the term group (p<0.05). Imminent and incipient intrauterine asphyxia of the first and the second twin were more frequent in the preterm than the term group (p<0.05) (Table 3).

Table 2. Foetal characteristics in twin pregnancies

Foetal characteristics	No (%) of foetuses in the group			P
	Preterm	Term	Total	
Foetal anomalies*	2 (0.8)	1 (0.7)	3 (0.82)	0.259
Foetal presentation and lie				
Cephalic/breech	34 (15)	13 (9.5)	47 (12.9)	
Breech/cephalic	21 (9.2)	17 (12.5)	38 (10.5)	
Breech/breech	10 (4.4)	9 (6.6)	19 (5.2)	
Transverse/oblique lie I/II twin	33 (14.6)	39 (28.6)	72 (19.9)	
Cephalic/cephalic	128 (56.6)	59 (43.3)	187 (51.6)	0.232
Intrauterine asphyxia				
Imminent I twin	101 (44.6)	40 (29.4)	141 (38.9)	<0.05
Imminent II twin	116 (51.3)	49 (36)	165 (45.6)	0.009
Incipient I twin (AS<7)	44 (19.4)	3 (2.2)	47 (13)	<0.05
Incipient II twin (AS<7)	55 (24.3)	10 (7.3)	65 (18)	0.01
Intrauterine growth restriction				
I twin	38 (16.8)	28 (20.5)	66 (18.2)	
II twin	50 (22.1)	31 (22.7)	81 (22.3)	0.071

*two hearth and one brain anomalies

Table 3. Neonatal characteristics from twin pregnancies

Neonatal characteristics	No (%) of neonates in the group			p
	Preterm	Term	Total	
Average Apgar score (±SD)				
1. minute I twin	7.50 (±1.82)	8.53 (±0.99)	7.89 (±1.64)	<0.00001
1. minute II twin	7.15 (±1.95)	8.36 (±1.01)	7.61 (±1.76)	<0.00001
5. minute I twin	7.99 (±1.33)	8.72 (±0.74)	8.26 (±1.2)	<0.00001
5. minute II twin	7.73 (±1.53)	8.65 (±0.61)	8.08 (±1.34)	<0.00001
Birth weight (gr)				
Average I twin (±SD)	2189.23 (±543.36)	2788.45 (±400.50)	2414.35 (±573.1)	<0.00001
Average II twin (±SD)	2164.51 (±547.75)	2757.79 (±450.88)	2387.4 (±588.06)	<0.00001
ELBW in I twin (<1000 g)	5 (2.2)	0	5 (1.4)	0.0246
ELBW in II twin (<1000 g)	8 (3.5)	0	8 (2.2)	
VLBW in I twin (<1500 >1000 g)	20 (8.85)	0	20 (5.5)	0.0285
VLBW in II twin (<1500 >1000 g)	12 (5.3)	0	12 (3.3)	
LBW in I twin (<2500 >1500 g)	122 (54)	28 (20.5)	150 (41.43)	<0.002
LBW in II twin (<2500 >1500 g)	135 (59.7)	31 (22.7)	166 (45.85)	
Average birth length (±SD) (cm)				
I twin	46.83 (±4.59)	50.71 (±2.57)	48.29 (±4.38)	<0.00001
II twin	47.07 (±4.69)	50.52 (±2.86)	48.37 (±4.42)	<0.00001
Twin gender	452 (226)	272 (136)	724 (362)	
Male	79 (17.4)	47 (17.2)	126 (34.8)	
Female	79 (17.4)	47 (17.2)	126 (34.8)	<0.00004
Both male	75 (33.1)	38 (27.9)	113 (31.2)	
Both female	72 (31.8)	51 (37.5)	123 (33.9)	
Admission to NICU				
I twin	44 (19.4)	3 (2.2)	47 (13)	0.01
II twin	55 (24.3)	10 (7.3)	65 (18)	

ELBW Extremely low birth weight; VLBW, very low birth weight; LBW Low birth weight; NICU, neonatal intensive care unit

The average birth weight was significantly higher for the first twin in the preterm (p<0.00001) and the term group (p<0.00001). The average birth length was lower in the first twin in the preterm group (p<0.289), and higher in the first twin in the term group (p<0.288).

The average birth weight and length were significantly lower in the preterm group (p<0.00001). Extremely low birth weight was recorded in 13 twins, five (2.2%) in the first, and eight (3.5%) in the second twin pregnancies. Very low birth weight was recorded in 20 (8.8%) first twins, and in 12 (5.3%) second twins. Low birth weight was more frequent in the preterm group (p<0.002).

The more frequent twin gender was male in the preterm group, and female in the term group (p<0.00004). The male-female ratio was 352:372. Admission to NICU was found in 30.9% twins for the overall sample (Table 3).

Abnormalities of foetal presentation and lie were a predominant indication for CS, in 98 (57.6%) cases in the preterm, 78 (88.6%) in the term group and 176 (68.2%) for the overall sample (Table 4).

Table 4. Indications for Caesarean section

Indications	No (%) of caesarean section in the group			p
	Preterm	Term	Total	
Total number of caesarean section	170 (75.2)	88 (64.7)	258 (71.2)	0.5
Uterine scar (previous caesarean section, myomectomy)	15 (8.8)	12 (13.6)	27 (10.4)	0.5
Placental abnormalities	12 (7)	10 (11.3)	22 (8.5)	<0.05
Umbilical cord complications	11 (6.4)	10 (11.3)	21 (8.1)	0.477
Incipient intrauterine foetal asphyxia	99 (58.2)	13 (14.7)	112 (43.4)	0.01
Abnormalities of foetal presentation and lie	98 (57.6)	78 (88.6)	176 (68.2)	0.287

DISCUSSION

The results of presented study have shown 13.5/1000 pregnancies average rate of twin pregnancies fitting within the framework of our population, as well as with some reports for Caucasians, 10-16.8/1000 pregnancies (3,10).

Preterm birth in twin pregnancies is the leading cause of perinatal mortality and morbidity (2,11). It is believed that the high incidence of preterm birth is most often due to overgrowth and overstretching of the uterus (2). Schaaf et al. reported significant increase medically indicated preterm birth in multiple pregnancies as well (12). Israelian and Greek (3,9) study reported 56% and 63% deliveries, respectively, prior to 37 weeks of gestation among twin pregnancies, similarly to our results, 62.4%. Our study recorded 11.6% of early preterm birth, which is lower comparing to the groups below and above 35 years in the Greek study (23% and 28%, respectively) (3). An Alabama study (13) reported 1.3% twins of the total population contributing to 12.2% of the total preterm birth rate, which is similar to our report (1.35% and 12.1%, respectively). The prevalence of spontaneous preterm deliveries in our study is similar to other studies (13). These data from developed countries correspond to our data, indicating good perinatal care in Bosnia and Herzegovina (3,9,10,13).

Aisien et al. reported the age range of twin mothers was 16-47 (mean of 28), which correlates with our study (10).

Obstetrics comorbidities found in our study, even though more common in the preterm group, were not significantly higher than in the term group. This was also shown by Prapas et al. (3). Israeli study reported 29.3% preeclampsia/eclampsia and 41.3% hypertensive disease, which is higher in comparison to our 13.2% (for both hypertension/preeclamsia), probably because of the age differences (46.9 vs. 29.5 years of age) (9). A Tennessean study reported very similar frequency gestational hypertension/preeclampsia (12.9% vs 12.7%) with our study; however, a Turkish study reported low frequency of preeclampsia (6%) (14). Premature rupture of membranes was found by Avnon et al. in 28%, comparing to 31.2% in our study (9). A Greek and Turkish study reported higher frequency of MAR than in our study, especially in older women, probably because of greater availability of MAR (3,15). Childbirth in twin pregnancies is often accompanied by abnormal presentations, umbilical cord prolapse, placental abruption, placenta previa and low placental insertion, bleeding due to atony and irregular peeling of the placenta (16,17). All these complications were noted in our study. We have found higher frequency of placental abruption and umbilical cord complications compared to the Turkish and Greek study (3,15). This higher frequency of placental abruption in our study is probably because of the higher frequency of preeclampsia, as a risk factor for placental

abruption (3,15). Experiences have been divided considering the application of prophylactic cerclage in twin pregnancies (2). Murray et al. concluded that there was no evidence of the usefulness of cerclage in reducing the risk of preterm births in twins (17). The placement of cerclage with the usual indication is not contraindicated, on the contrary, it significantly reduces the proportion of birth in the gestational group up to 31 weeks of gestation (2). A Turkish study reported a higher frequency of urgent and elective cerclage than we found in our study, probably because of a high frequency of MAR (15).

Reported twins presentation during labour is roughly similar to the foetal presentation and lie in our study (10). Shorter gestation is associated with newborns with lower birth weight, more amniotic fluid, and a greater chance of change in the position and presentation (16).

The actual incidence of the IUGR is unknown, due to the use of growth curves for singleton pregnancies. There are growth curves for twin pregnancies as well, but most researchers believe they are result of small population data without considering the impact of the chorionicity and outcome of the pregnancy (2,8). The IUGR found in our study is similar to Alrahmani et al. study for adolescent and adult group (18). In our study, foetal anomalies occurred in 0.82%, which correlates with other studies (2).

Newborns from twin pregnancies have lower birth length and weight compared to singleton pregnancies of the same gestational age, which has a significant influence on perinatal outcome (2,10). The neonatal outcome of the second twin is usually more complicated due to abnormalities of presentation and lie and asphyxia associated with operative manipulation during delivery, which is demonstrated in our study, as well (10). Israeli study reported lower average birth weight in comparison to our results in both, the first and second twin (9). Aisien et al. reported a higher incidence of low birth weight newborns than in our study probably because of differences among study populations (10). Israeli study reported higher frequency of VLBWI in comparison to our study, probably because of the difference in age (advanced maternal age in Israeli group) (9). Older women have a significantly higher frequency of delivery with VLBWI (3).

Admission to NICU in our study, as well as the frequency of Apgar score below 7 in the first and the fifth minute correlated with other studies (3,9,13).

The mode of delivery in premature twins, as well as in all other combinations when the first twin does not lead cephalic, is a matter of debate and controversy (7,16). Several studies reported different frequency of CS from 26% (low), 52% (moderate) to 70% and 100% (high), matching our results in the high frequency group, 71.27% (3,9,10). In comparison with the results of our study, all known indications for CS in one Nigerian study were found in lower prevalence (10). These differences, respectively, the higher frequency of CS and the CS indication can be explained by population differences: poor obstetric practice, as well as a decline in obstetric skills, causes more and more pregnancies, especially, twin pregnancies to be delivered by CS (19). There were no reports of maternal death in a Nigerian study among twin bearing mothers, and the results correlate with ours (10).

The strength of this study is a large number of analysed twin pregnancies. Limitations are the retrospective nature of the study and the absence of data about amnionicity and chorionicity (because primary care obstetricians in our country do not record such data during the first trimester ultrasound examination). However, lack of those data led to fail in stratification of twin pregnancies for the differences in amnionicity and horionicity. Furthermore, the data concerning clear information about population characteristics like ethnicity, educational status, socioeconomic condition, were restricted.

In conclusion, medically assisted reproduction does not significantly increase the incidence of twin pregnancies in our country. Maternal comorbidities and obstetric complications, though more frequent, do not have a significantly higher prevalence in preterm births in twin pregnancies. As expected, preterm delivery is the major cause of neonatal morbidity and admission to NICU in twin pregnancies. Cornerstone of twin pregnancy antenatal care is to get correct data about amnionicity and chorionicity. Since majority of prenatal data did not have this information we call upon all obstetricians to dec-

lare about amnionicity and chorionicity in twin pregnancies during the first trimester ultrasound examination. These data are crucial for the future antenatal planning.

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TRANSPARENCY DECLARATION

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